EcoMobility

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FOR A SUSTAINABLE SOCIETY WITH INTELLIGENT MOBILITY SOLUTIONS

D7.1 EcoMobility initial stakeholder's Identification

asvin GmbH

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1 Executive Summary

The mobility industry is going through the disruptions which is powered by Autonomous driving, Connected cars, Electrified vehicles, and Shared mobility (ACES). It promises and has potential to turn the industry upside down in a positive way. But at the same time, it has brought in the challenges all industry stakeholders. The EcoMobility project aims to address the challenges in the area of design methods, E/E architecture (on-board intelligent, trustworthy electronic components and systems), connectivity mechanisms, battery management, multimodal transport system, business model etc. It has vision to achieve a sustainable value chain and enabling technologies for door-to-door mobility of people and vision goods based on customized autonomous vehicles with agile life cycle management for continuous evolution of services and improved safety, security, efficiency and ecology. It is paramount to identify, engage and cooperate with all stakeholders to make this vision into reality. The task T7.1 works along those lines and focuses on the stakeholder management and ecosystem building.

The deliverable D7.1 contains the outcomes of the activities performed in the T7.1 on stakeholder management. It furnishes the details of on the global and EU vehicle market by taking the leaf from D7.8 - Market study. It forms the basis of the deliverable on top of which stakeholder management is executed. Furthermore, it gives details on the

2 Introduction

2.1 Introduction - Purpose of this document

The document represents the deliverable **D7.1: EcoMobility initial stakeholders' identification**. It contains detailed report on the activities performed and results collected under the task **T7.1: Stakeholder management and ecosystem building**. The objective of the task to provide feedback to the consortium and the ecosystem (automotive industry, consumer organizations, EV mobility providers) on consumer acceptance strategies. The aim of the deliverable is to analyze the global and EU electrical vehicle market and identify the relevant stakeholders in the target market.

The deliverable will form the premise of the planning and execution of stakeholder management throughout the project. It introduces a methodology for the stakeholder identification. Additionally, the stakeholders will be categorized and prioritize in the context of the EcoMobility project. It is a quite important step and once the stakeholders are identified, categorized and prioritized, we will create a bidirectional channel to communication & disseminate project results and collect inputs.

2.2 Definitions

Definitions, Acronyms, Abbreviations	Meaning
ADAS	Advanced driver assistance systems
AI	Artificial Intelligence
ML	Machine Learning
AV	Automated Vehicle
BEV	Battery Electric Vehicles
BMS	Battery Management Systems
CAV	Connected and Automated Vehicles
CCS	Combined Charging System
CDE	Communication, dissemination, and exploitation
CV	Connected Vehicle
ICT	Information and communications technology
LDW	Lane departure warning
NGO	Non-governmental organization
NSB	National Standards Bodies
OSI	Open Source Initiative
PHEV	Plug-in hybrid electric vehicle
SAE	Society of Automotive Engineers
SDGs	Sustainable Development Goals
SDO	Standards Development Organizations

SMART	Specific, measurable, achievable, realistic and timely
SME	Small and medium-sized enterprises
SH	Stakeholder
STEEP	Social-Technological-Economic-Environmental-Political
SUV	Sport utility vehicle
TAM	Target Addressable Market
V2V	Vehicle to Vehicle

Table 1: Definitions, Acronyms, Abbreviations

2.3 Applicable Documents

AD1: EcoMobility Grant Agreement

2.4 Document Structure

The deliverable contains multiple sections on various topics. It is structured as follows:

- Section 1 provides the details of the deliverable in the form of executive summary. It outlines the background, objective, key findings and action points of the deliverable.
- Section 2 gives details on the purpose and structure of the document. Additionally, acronym definitions and application document information are also given.
- Section 3 illustrates the market landscape of the target addressable market of the EcoMobility results.
- Section 4 presents the details on stakeholder analysis which include stakeholder's identification, categorization, prioritization and engagement.
- Section 5 summarizes the deliverable and provides conclusion and future action points on the topic.

3 Electric Vehicle Market

Through the sharing of data and services amongst participating stakeholders, EcoMobility will assist European industry and cities in making the shift from isolated and static transportation methods towards a service-centric, linked mobility ecosystem. The project will make it possible to create, implement, operate, and manage the life cycle of connected adaptive end-to-end mobility systems in a sustainable manner through collaboration. EcoMobility project will contribute as follows:

- Implementation of DevOps techniques in the supply chain, together with ongoing, personalized cloud-based mobility service additions and enhancements.
- Facilitate the deployment of AI solutions through contract-based runtime coupling of mobility services within edge/cloud-based services, along with the monitoring, analysis, and coordination of automobiles, transportation infrastructures, and people.
- Provide dependable and improved vision, perception, and localization systems—including high-definition maps—for automated, linked, and safe automobiles.
- Provide ADAS systems that are better and more individualized, reflecting the technological prowess of diverse cars and safeguarding the most vulnerable road users.
- Offer energy-conscious scheduling and control for electric vehicles, including intelligent Battery Management Systems (BMS) and integration with other modes of transportation.
- Help close the gaps between legal and regulatory frameworks and technology breakthroughs, as well as aid in the growing public acceptance of autonomous vehicles that are powered by electricity.

The EcoMobility demonstrators will present the project's results and capabilities for the complete sustainable mobility ecosystem, with an emphasis on how these developments will affect the efficiency, ecology, safety, and trustworthiness of mobility solutions at a scale suitable for mass-market adoption. Emerging technologies will provide Europe a competitive edge in a rising market and directly contribute to the European objective of zero road fatalities by 2050 by using the experience of renowned industrial and research partners throughout the mobility value chain.

Traditional automakers and suppliers are being forced to modify their business models due to many problems that are altering both the vehicles themselves and the production processes, even though the traditional auto sector continues to play a significant part in the global economy. Consumer demand for new services, the entry of new competitors into the automotive sector, and the development of innovative ideas like linked cars, autonomous driving, and car sharing are all influenced by digital transformation.

The introduction of Connected and Autonomous vehicles (CAVs), which are altering both the production process and the general use of automobiles, is the result of recent breakthroughs in the automotive industry. Connected Vehicle (CV) and Automated Vehicle (AV) technologies are leveraged by Connected and Automated Vehicles (CAV) by communicating with nearby vehicles and infrastructure thus providing vehicle automation to make driving decisions. CAVs are self-driving vehicles that can link to external networks for communication purposes, such as with other vehicles, infrastructure, or general information provision1. They require minimal input from the driver. CAVs can provide end users with a variety of advantages over human-driven cars, including reduced costs, less traffic, and increased road safety. Because of this, it

is anticipated that CAVs will have a significant impact on the automotive sector. The European Road Transport Research Advisory Council (2017) anticipates that autonomous vehicles (SAE level 5) capable of driving from door to door in any kind of traffic will be accessible before 2030 [4] as illustrated in Figure 1.

Figure 1: : Vehicle automation [4]

The growth of digital technologies, including high-performance computing, connectivity, global positioning/HD mapping, robotics/artificial intelligence (AI), smart sensors/computer vision, and high-performance computing, has made it possible for the market for CAVs to change.

3.1 Global Electric Market

The number o, following a decade of explosive expansion. In 2020, two-thirds of new electric car registrations and two-thirds of the stock were battery electric cars, or BEVs. China leads the world in the number of electric vehicles with 4.5 million, but Europe saw the biggest yearly gain in 2020, reaching 3.2 million as shown in Figure 2.

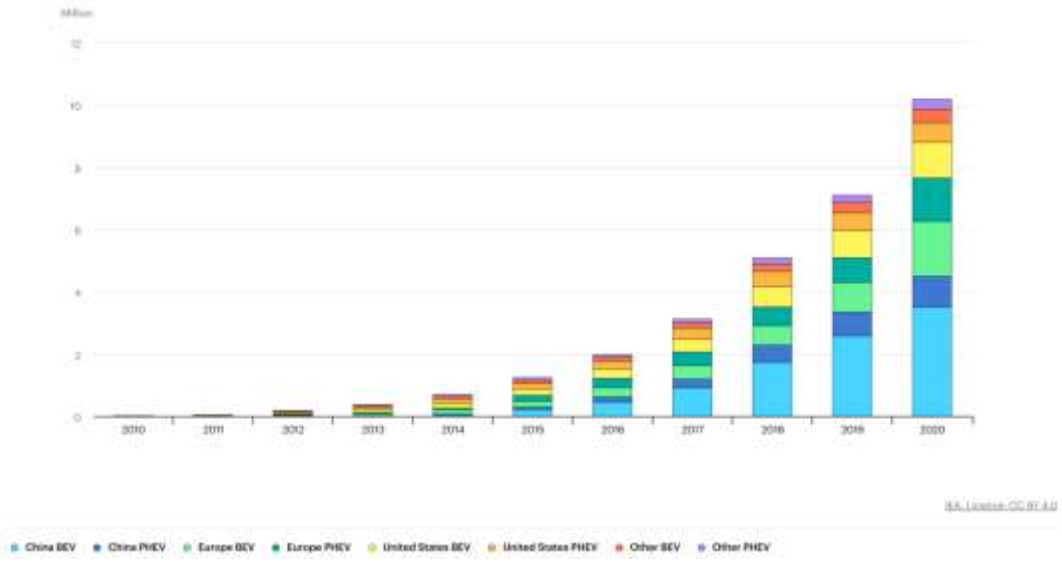

Figure 2: Global electric passenger car stock [8]

Overall, the economic effects of the Covid-19 pandemic had a considerable impact on the global market for all car kinds. New car registrations fell almost one-third from the year before in the first half of 2020. Stronger activity in the second half of the year somewhat countered this, leading to a 16% year-over-year decline. Notably, global sales of electric cars increased 70% to a record 4.6% in 2020, despite a decline in new auto registrations overall and for conventional vehicles.

In 2020, there were almost 3 million new electric vehicles registered. With 1.4 million new registrations, Europe took the lead for the first time. With 1.2 million registrations, China came in second, and the US registered 295,000 new electric vehicles.

In 2020, there were more electric car registrations due to a variety of factors. Notably, the total cost of ownership of electric cars is rapidly rising in certain nations. A number of countries offered or extended financial incentives to protect buyers of electric cars from the decline in the auto industry.

3.2 EU Electric Market

In the EU, electric vehicles accounted for 21.6% of newly registered automobiles in 2022, indicating significant advancements in the adoption of electric cars and vans. increasing from 1,74 million in 2021 to over two million electric vehicle registrations in a single year. In 2022, electric vans accounted for 5.5% of all new registrations on European roads, continuing to rise in popularity. While the number of plug-in hybrid vehicles was constant, the number of newly registered battery electric vehicles climbed by 25% over the previous year. The bulk of electric van registrations in 2022 came from battery-electric vehicles as shown in Figure 3.

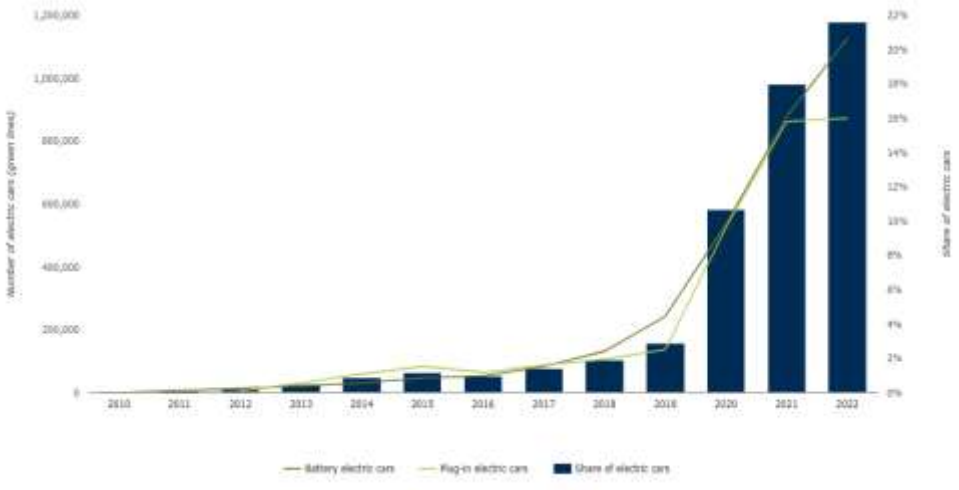

Figure 3: New registration of electric cars [6]

One of the main industries contributing to greenhouse gas emissions in the EU is transportation. Thus, lowering transportation-related emissions is essential to achieving the EU's climate neutrality goals.

Regulation (EU) 2019/631, which goes into effect in 2025, establishes more stringent CO2 fleet targets for the entire EU: 15% for cars and vans by 2025, and from 2030, 50% and 55% reductions, respectively, for vans and cars, based on a baseline of 2021. A zero-CO2 emission target is also set for new automobiles and vans starting in 2035. It will take a large increase in the adoption of electric vehicles to meet these objectives.

Plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) are two types of electric cars that are progressively making their way into the EU market. From 600 in 2010 to about 1,74 million in 2021—or 18% of all new registrations—there has been a consistent rise in the number of new electric car registrations. In 2022, when over 22% of newly registered passenger cars were electric, these numbers grew even more. In 2022, the percentage of new cars registered was 12.2% for BEVs and 9.4% for PHEVs [6].

While PHEVs have an average mass of approximately 1,900 kg, BEVs have an average mass of 1,800 kg. Provisional 2022 data indicates that the average energy consumption of these vehicles was around 166 and 177 Wh/km, respectively. When operating in electric mode, BEVs registered in 2022 had an average electric range (measured at type-approval) of 393 km, while PHEVs had an average electric range of 61 km.

The EU-27 sold about 56,500 electric vans in 2022, accounting for 5.5% of the market share and a rise of about 2.0 percentage points from 2020. BEVs accounted for the bulk of sales electric vans.

Though new registration for vehicles have grown significantly in recent years, BEVs still only make up 1.2% of all cars in Europe. In order to assist EU fulfill its emissions reduction targets and assure progress towards its 2050 goal of being climate neutral, the fleet of electric vehicles in Europe needs to continue growing [5].

3.3 Competitive Advantage of EU Market

Inherently EU Automotive market has been a force since years on the global market. There are multiple variables which have contributed to its success. The electric vehicle (EV) market has emerged as a pivotal player in the global automotive industry, offering a sustainable solution to transportation challenges while addressing environmental concerns. As nations worldwide

pivot towards cleaner energy sources and decarbonization efforts, the European Union (EU) stands at the forefront of this transition with its robust and dynamic electric vehicle market.

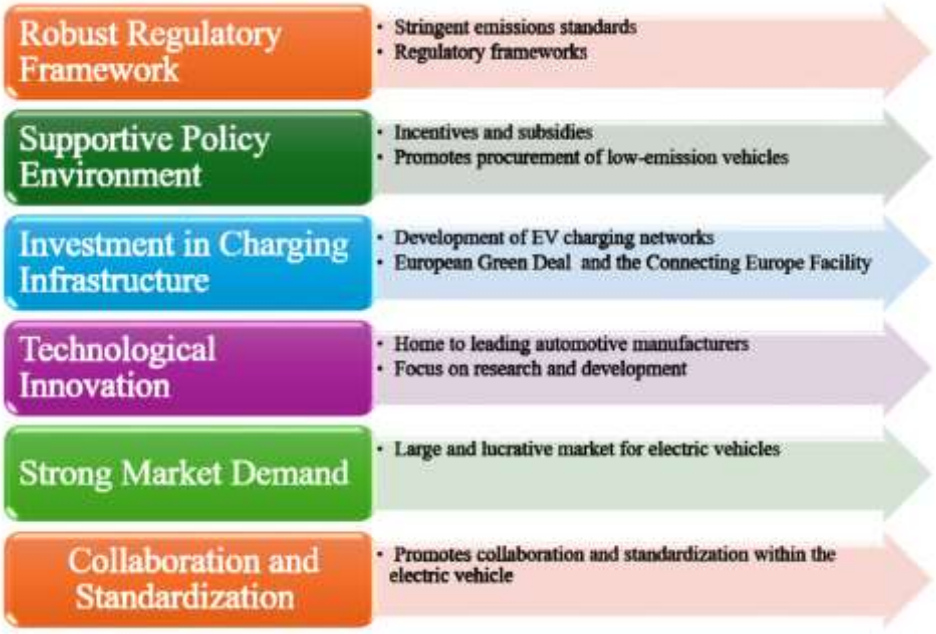

Figure 4: Factors leading to competitive advantage of EU Market

With stringent emissions regulations, supportive policies, extensive charging infrastructure, and a focus on technological innovation, the EU electric vehicle market presents a compelling case for sustainable mobility solutions. Some of the success factors are outlined in Figure 4 and described below.

- **Robust Regulatory Framework**: The EU has established stringent emissions standards and regulatory frameworks aimed at reducing greenhouse gas emissions and promoting clean transportation. This includes regulations such as the Euro 6 emissions standard[1] and CO_2 emission performance standards for cars and vans[2]. Furthermore, EU commission has proposed new Euro 7 standards to reduce pollutant emissions from vehicles and improve air quality[3]. Such regulations incentivize the development and adoption of electric vehicles, positioning the EU as a leader in environmental sustainability.
- **Supportive Policy Environment**: The EU offers various incentives and subsidies to encourage the adoption of electric vehicles, such as purchase incentives, tax breaks, and rebates for EV owners[4]. Additionally, the EU's Clean Vehicles Directive[5] promotes the

[1] Commission Regulation (EU) No 459/2012 of 29 May 2012 amending Regulation (EC) No 715/2007 of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6), https://eur-lex.europa.eu/eli/reg/2012/459/oj

[2] Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO2 emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02019R0631-20231203

[3] Euro 7 proposal, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6495

[4] European Alternative Fuels Observatory, https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road

[5] Clean Vehicles Directive, https://transport.ec.europa.eu/transport-themes/clean-transport/clean-and-energy-efficient-vehicles/clean-vehicles-directive_en

procurement of low-emission vehicles by public authorities. These supportive policies create a conducive environment for the growth of the electric vehicle market in the EU.

- **Investment in Charging Infrastructure**: The EU has made significant investments in charging infrastructure to support the widespread adoption of electric vehicles. Initiatives such as the European Green Deal[6] and the Connecting Europe Facility[7] provide funding for the development of EV charging networks across member states. This extensive charging infrastructure reduces range anxiety among EV drivers and enhances the attractiveness of electric vehicles in the EU market.
- **Technological Innovation**: The EU is home to leading automotive manufacturers and technology companies that are investing heavily in the development of electric vehicle technology. These companies are focused on research and development efforts to improve battery technology, increase vehicle range, and enhance charging capabilities. The EU's emphasis on innovation positions it at the forefront of electric vehicle technology globally.
- **Strong Market Demand**: The EU represents a large and lucrative market for electric vehicles, driven by consumer demand for environmentally friendly transportation options. Growing awareness of climate change and air pollution concerns, coupled with supportive government policies, has led to an increasing preference for electric vehicles among European consumers.
- **Collaboration and Standardization**: The EU promotes collaboration and standardization within the electric vehicle industry, facilitating interoperability and compatibility across different markets. Standardization efforts such as the Combined Charging System[8] (CCS) for EV charging infrastructure ensure consistency and ease of use for electric vehicle owners across the EU.

3.4 Impact of EcoMobility

EcoMobility project aims at exploiting new ways to address challenges related to the digital mobility at the business models & mobility level, and to validate the technologies developed through real-world use cases. Some objectives are as follows:

- To enable continuous and robust optimization of well adapted design methods and value chains to achieve digital mobility.
- To develop on-board intelligent, trustworthy electronic components and systems for the next generation automated driving.
- To develop intelligent connectivity mechanisms and architectures for safer, greener, and more efficient road mobility.
- To develop smart battery management system with cloud-based AI services and enhanced hardware for longer battery life and reliability.

[6] The European Green Deal, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

[7] Connecting Europe Facility, https://cinea.ec.europa.eu/programmes/connecting-europe-facility_en

[8] The Combined Charging System is an open international standardized system and mainly driven by Audi, BMW, Chrysler, Daimler, Ford, General Motors, Porsche and Volkswagen, https://tesla.o.auroraobjects.eu/Design_Guide_Combined_Charging_System_V3_1_1.pdf

- To develop a multimodal transport system for goods and passengers aiming to a more sustainable and efficient transport through smart city solutions.
- To provide market intelligence to strengthen European electrified vehicle industry, enhance user acceptance, and ensure European leadership.

The integration of traffic systems within road infrastructure presents a golden opportunity for local governments to cater to the evolving needs of commuters. By embracing EcoMobility principles in transportation, particularly through innovative urban street solutions, communities can witness a paradigm shift in the planning, design, construction, and operation of transportation facilities. These forward-thinking approaches not only promise to create aesthetically pleasing neighborhoods and urban streets but also prioritize mobility and safety for all street users, thereby bolstering community sustainability. EcoMobility's commitment to green transportation transcends conventional boundaries, offering integrated and environmentally friendly alternatives that transcend reliance on public or private vehicles.

EcoMobility promotes sustainability and environmental consciousness through its advanced tools and technologies. As a result, there could be a surge in the adoption of electric vehicles as a clean and eco-friendly mode of transportation. This increased demand could further incentivize manufacturers to produce more EV models and expand their offerings. Furthermore, the development of Automated map digitalization technology in SC5 and the integration of modern perception techniques represent significant technological advancements. These innovations could potentially enhance the functionality and efficiency of electric vehicles, making them more attractive to consumers

4 Stakeholders Management

The global automotive market is changing drastically to support the requirements raised by the ACES trends in the industry. It was outlined in the EcoMobility proposal and has been reassured by the extensive market study report in the EcoMobility deliverable D7.8. We have summarized the results in section 3 and the clear message is that the target addressable market for the EcoMobility project is quite large not only in terms of market capitalization but also with respect to the technologies, processes and tools. The EcoMobility project has defined specific, measurable, achievable, realistic and timely (SMART) objectives to confront and resolve the challenges of the target addressable market.

The objectives of the projects are backed by the various technological components, tools and processes which will be designed and developed in various tasks and work packages. The technical outcomes of the project will include tools and methods framework that supports continuous optimization of vehicles, improved sensors, integrated sensor systems and AI-based sensor fusion for automated driving, intelligent, networked, and automated vehicle architectures, sustainable and efficient multimodal transportation solutions and strengthening the European automotive value chain.

To adapt to the ever changing challenges of the target addressable market and to design and develop the proposed solutions, the constant exchange between the EcoMobility consortium and the market is of prime importance. A comprehensive research on the market landscape, including its size, trends, segments, potential spending and stakeholders is required to establish this link and sustain it. The deliverable D7.8: Market Study describes the aforementioned characteristics except the stakeholders. We understand that it is a multiplayer market and each player brings its own set of requirements and obstacles. It is a best practice to understand the stakeholder of the market to develop impactful solutions. This deliverable is dedicated to the stakeholder analysis and management.

This section sheds light on stakeholder in the target addressable market of the EcoMobility project. The stakeholder analysis will serve two vital objectives 1) better understand the market, its needs and challenges 2) maximize the impact of the EcoMobility project results. The project will a scientific methodology to perform the stakeholder management. The following sub-sections explain it in more details.

4.1 Methodology

To ensure effective uptake of project results, EcoMobility employs a strategic approach involving stakeholder mapping and tailored outreach measures. This includes identification of stakeholders, engagement and communication with various stakeholder groups such as the scientific community, innovators, vertical industries, policymakers, standardization bodies, media, and citizens. Figure 4 illustrated the EcoMobility methodology for stakeholder management.

Figure 5: Stakeholder management methodology

- **Stakeholder identification** is the foundational step, involving the systematic identification of all individuals and groups who have a vested interest, influence, or impact on the project's outcomes. This process entails casting a wide net to capture a comprehensive range of stakeholders, including automotive manufacturers, suppliers, regulatory bodies, academic institutions, government agencies, investors, and end-users. Through thorough stakeholder identification, the EcoMobility team will gain a clear understanding of the diverse array of stakeholders involved, enabling effective engagement and management throughout the project lifecycle.
- **Stakeholder categorization** is the subsequent process of grouping identified stakeholders based on criteria such as their level of influence, interest, and relevance to the EcoMobility project. This categorization allows for a structured approach to stakeholder management, ensuring that resources and efforts are directed towards engaging with stakeholders who wield the greatest influence or are most affected by the project's outcomes.
- **Stakeholder prioritization** involves assessing and ranking stakeholders based on their level of importance, influence, and potential impact on the project. By prioritizing stakeholders, the EcoMobility project team will be able to focus their engagement efforts and resources on those stakeholders who have the greatest ability to affect the project's success or who are most critical to its implementation. This process ensures that limited resources are allocated effectively and that key stakeholders receive the attention and support necessary to facilitate their engagement and alignment with project goals.
- **Stakeholder engagement** is the proactive and ongoing process of involving stakeholders in the EcoMobility project, soliciting their input, addressing their concerns, and fostering collaboration and communication throughout the project

lifecycle. Effective stakeholder engagement requires tailored communication strategies and channels that resonate with the diverse needs and preferences of different stakeholder groups. Engagement efforts will include regular meetings, workshops, focus groups, surveys, and stakeholder consultations, aimed at building relationships, gathering insights, and aligning stakeholder expectations with project objectives. By engaging stakeholders early and continuously, EcoMobility will leverage stakeholder expertise, resources, and support, ultimately enhancing project outcomes and impact.

4.1.1 Quituple Helix Innovation Model

The Quintuple Helix Innovation model expands upon the Quadruple Helix model by incorporating the natural environment as the fifth helix [7]. It is illustrated in Figure 6. This model emphasizes the interaction and collaboration between academia, industry, government, civil society, and the natural environment to foster innovation and drive societal progress.

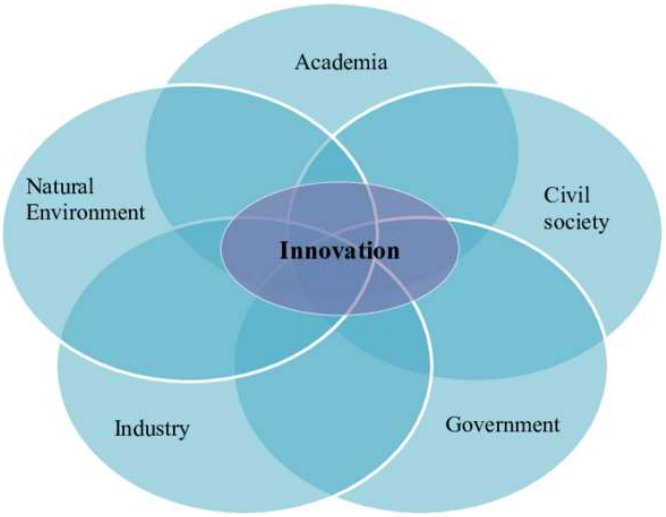

Figure 6: Quintuple Helix Innovation model

In the context of EcoMobility, this model is leveraged to maximize the impact of the project across all five helixes. Here's how EcoMobility aims to achieve this:

1. **Engaging Automotive Industrial Stakeholders**: By bringing together leading automotive industry stakeholders, EcoMobility aims to deliver tangible outcomes affecting the entire life cycle of products and services. This involvement ensures that innovation is driven throughout the industry, impacting economic and industrial aspects (first helix).
2. **Empowering Civil Society**: EcoMobility enables civil society to capitalize on business and societal opportunities within the automotive industry. By fostering uptake and participation, the project contributes to societal well-being and economic development (second helix).
3. **Unlocking R&D Potential**: The project focuses on unlocking the research and development potential of the European Union in key drivers of mobility innovation. This involves leveraging scientific excellence to drive innovation and address societal challenges (third helix).
4. **Promoting Users' Acceptance and Adoption**: EcoMobility promotes users' acceptance and adoption of mobility solutions through state-of-the-art measurement and monitoring methodologies. By aligning with user needs and preferences, the project facilitates policy initiatives and enhances the mobility ecosystem (fourth helix).

5. **Addressing Environmental Priorities**: EcoMobility addresses key environmental priorities and challenges throughout the lifecycle of mobility, integrating sustainability considerations into its approach. This ensures that environmental concerns are addressed, aligning with the natural environment helix (fifth helix).

4.2 Key Stakeholders

The EcoMobility project is going to have far reaching impact in the electric vehicle market with its proposed solutions. There are various individuals, groups and organizations which have vested interests in the project and will be impacted by its developed tools, technologies and processes. We identify them as stakeholders of the project. Each stakeholder has varying degree of involvement, interests and support in the activities, decisions and outcomes of the project. Creating relationships with stakeholders, maintaining them by addressing their concerns, managing their expectation are essentials of the core philosophy of the EcoMobility project.

It all starts with the identification of the project stakeholders. We have taken objectives, target addressable market, impacted segments and potential outcomes of the project as basis in the stakeholder identification process. Our goal is to create and maintain a list of stakeholders throughout the project lifecycle. It will serve as a foundation to all other stakeholder activities e.g., analysis, categorization, engagement, and will help us to maximize project impact.

Figure 7: EcoMobility Stakeholders

During the project lifecycle and beyond, we will interact with broad spectrum of stakeholders which will be directly or indirectly impactful or impacted by the project results. Two components form the basis of the plan to guarantee that the project's outcomes are effectively assimilated: 1) A thorough and deliberate mapping of the landscape of EcoMobility's stakeholders to pinpoint the target end-user groups. 2) Outreach initiatives designed to reach out to the many groups that have been identified in order to encourage the acceptance of EcoMobility's outcomes and additional networking. The identified key stakeholders of the project are mentioned in Figure 7 and are as follows.

- **SH1 - Scientific community:** It includes researchers and innovators in field of autonomous driving, cloud-edge continuum, IoT, AI, sensors, battery management, and process optimization. We will engage with them open access publications, participation/presence in scientific events, exhibitions and workshops, targeted social media and online communication campaigns, science cafes, webinars, and showcasing events.
- **SH2 - Open-Source Community:** It comprises of diverse range of people, roles, groups and organization that support, contribute, utilize and promote open-source software and projects. Our engagement with them will involve participation in Eclipse Edge Native Working Group activities, industrial events (IoT and smart factory area), AI initiatives such as, AI/ML challenges and contribution to OS and organization of workshops, webinars, hackathons involving experimental infrastructures.
- **SH3 - Vertical industries, SMEs and Start-ups:** These are the early adopters, with putting emphasis on AI, automotive security, shared mobility, smart cities, utilities, etc.

We interact with them by participation and presentations in targeted events, networking sessions, interactive demos and showcasing, social media, website, specialized press.

- **SH4 - Policy makers:** This includes government institutes, politicians, think tanks, advisory bodies etc. We participate and present the EcoMobility in selected policy making events, promo materials, networking sessions - liaison with the public, interactive demos, communication especially relevant to road mapping work.
- **SH5 - Standardization community**: It incorporates standard development organization, national/international standard bodies industry associations, regulatory association etc. EcoMobility, we undertake activities with them to i) assess the project's Social-Technological-Economic-Environmental-Political (STEEP) aspects; ii) define the future research and innovation directions for the EC initiatives, considering the project's acquired knowledge and experience; iii) provide Inputs for standardization activities
- **SH6 - Citizen**: EcoMobility will dialogue with ICT and vertical industries specialized press to ensure the solutions developed within the project get visibility among relevant stakeholders. The website and promotional materials will ensure all citizens have access to the activities and results achieved.
- **SH7 – Consortium Partners**: EcoMobility is a large consortium with 44 project partners from various countries. Each partner brings in individual contribution and collaborate on.

4.2.1 SH1- Scientific Community

The scientific community refers to a network of scientists, researchers, scholars, academics, and professionals who are engaged in scientific inquiry, discovery, and knowledge dissemination across various disciplines and fields of study. The EcoMobility project consortium include multiple research universities and institutes. The list of key players in the scientific community are illustrated in Figure 8.

Figure 8: Key players in SH1

4.2.1.1 Interest

- **Technological Advancement**: The scientific community in automotive research projects is driven by the goal of advancing technology within the automotive industry. Researchers aim to develop innovative technologies, materials, and methodologies

related to vehicle design, propulsion systems, safety features, and environmental impact.

- **Sustainability and Environmental Impact**: Another key interest of the scientific community is addressing sustainability and reducing the environmental impact of vehicles. Researchers focus on developing technologies to minimize emissions, improve fuel efficiency, and promote the adoption of electric and alternative fuel vehicles to mitigate climate change and air pollution.
- **Safety**: Enhancing vehicle safety to protect occupants and pedestrians is a significant focus for the scientific community. Researchers work on advanced safety features, collision avoidance systems, and autonomous driving technologies to reduce accidents and injuries on the road.
- **Efficiency and Performance**: The scientific community is also interested in improving the efficiency and performance of vehicles to enhance the driving experience and meet consumer demands. This includes optimizing engine efficiency, reducing weight, improving aerodynamics, and enhancing vehicle dynamics for better handling and performance.
- **Economic and Industrial Competitiveness**: Economic and industrial competitiveness is another area of interest for the scientific community. Researchers aim to develop innovative technologies and products to maintain or improve the position of their organizations or countries in the global automotive market.
- **Education and Knowledge Sharing**: Lastly, the scientific community is motivated by the opportunity to contribute to the body of knowledge in the field and educate future generations. Researchers publish their findings, participate in academic programs, and engage in knowledge-sharing activities to advance the field of automotive research and education.

4.2.1.2 Medium of Communication

We will utilize the communicatio medium mentioned in Table 2 to engage with key players in SH1.

Communication medium	Description
Research Conferences and Workshops	Participate in relevant conferences and workshops focused on automotive security to engage with stakeholders, share project updates, and gather feedback.
Collaborative Research Projects	Initiate collaborative research projects with academic institutions and research organizations to leverage expertise and resources in advancing automotive security.
Online Platforms and Forums	Utilize online platforms, forums, and discussion groups dedicated to automotive security to disseminate project findings, exchange ideas, and interact with stakeholders.
Webinars and Online Seminars	Organize webinars and online seminars to present project findings, demonstrate technologies, and engage with a wider audience of stakeholders from across the scientific community.

Research Associations and Networks	Engage with automotive industry associations and professional networks to share project updates, seek collaboration opportunities, and contribute to industry-wide initiatives related to automotive security
Research Publications	Publish research papers in respected journal and conference on the outcomes of the EcoMobility Project.

Table 2: SH1- medium of communication

4.2.2 SH2 – Open Source Community

The open-source community refers to a diverse group of individuals, organizations, and communities that collaborate on the development, distribution, and improvement of open-source software and projects. Open-source software is software whose source code is freely available for anyone to view, modify, and distribute.

The open-source community operates on principles of transparency, collaboration, and inclusivity. Members of the community contribute to projects in various ways, including writing code, testing software, documenting features, providing feedback, and offering support to users. Some key players in the open-source community are described in Figure 9.

Figure 9: Key players in SH2

4.2.2.1 Interest

The opensource community is driven by following interests.

- **Contribution Opportunities**: Developers and contributors are interested in opportunities to contribute code, documentation, and bug fixes to open-source projects within the EcoMobility ecosystem, as it aligns with their passion for collaborative software development.
- **Project Governance and Transparency**: Maintainers, project leaders, and community members are interested in the governance structure and transparency of the EcoMobility project. They seek clear communication channels, open decision-making processes, and inclusive community engagement.
- **Access to Innovative Technologies**: Users and community members are interested in accessing and utilizing innovative technologies developed within the EcoMobility project. They seek open-source solutions that enhance mobility services, improve user experiences, and contribute to sustainability goals.

- **Knowledge Sharing and Learning**: Academic and research institutions, along with developers and community members, are interested in opportunities for knowledge sharing and learning through collaboration with the EcoMobility project. They seek access to research findings, technical insights, and best practices in open-source software development.
- **Advocacy for Open Source Principles**: Foundations, nonprofit organizations, government agencies, and the Open Source Initiative (OSI) are interested in supporting projects like EcoMobility that promote open-source principles, collaboration, and innovation. They seek opportunities to advocate for the adoption of open-source software, contribute resources, and foster community growth.

4.2.2.2 Medium of Communication

In the EcoMobility project, we will utilize following methods to reach to the identified key players of the open-source community.

Communication medium	Description
Engage on Online Platforms	Utilize online communities, forums, mailing lists, and social media platforms frequented by open-source developers and enthusiasts to share updates, solicit feedback, and facilitate discussions about the EcoMobility project
Host Virtual Events	Organize virtual events such as webinars, workshops, and hackathons to engage with the open-source community, showcase project developments, and provide opportunities for collaboration and contribution.
Maintain an Open Development Process	Ensure transparency and inclusivity in the project's development process by openly sharing project roadmaps, design documents, and decision-making discussions. Encourage community participation and feedback through public forums and contribution guidelines.
Provide Documentation and Resources	Offer comprehensive documentation, tutorials, and resources to help developers and contributors understand the project's architecture, coding conventions, contribution guidelines, and best practices
Establish Communication Channels	Set up dedicated communication channels such as mailing lists, chat rooms, and issue trackers to facilitate ongoing communication and collaboration among project contributors, maintainers, and users
Participate in Open Source Events	Engage with the broader open-source community by participating in relevant conferences, meetups, and events. Use these opportunities to showcase EcoMobility's contributions, network with potential collaborators, and stay updated on industry trends and best practices
Collaborate with Open Source Organizations	Partner with open-source foundations, nonprofit organizations, and advocacy groups to leverage their expertise, resources, and networks. Collaborate on joint initiatives, sponsorships, or

	outreach campaigns to amplify the visibility and impact of the EcoMobility project within the open-source ecosystem

Table 3: SH2- medium of communication

4.2.3 SH3 – Vertical Industries, SMEs, and Startups

Vertical industry refers to a specific sector or niche within the economy that focuses on a particular type of product or service. These industries are often characterized by their specialization in a particular area of business or technology. SMEs are businesses that fall within a certain range of annual revenue, assets, or number of employees, depending on the country and industry. Startups are newly established businesses that are typically founded by entrepreneurs with innovative ideas or solutions. Startups are often characterized by their high-growth potential, disruptive business models, and focus on scalability. For the EcoMobility project all 3 are quite relevant. We have identified key players in this stakeholder category which are described in Figure 10.

Figure 10: Key players in SH3

4.2.3.1 Interest

There are following interests which motivates the key player.

- **Innovation Opportunities**: These stakeholders are interested in accessing innovative technologies and solutions, particularly those related to artificial intelligence (AI), automotive security, and smart city infrastructure. They see the project as an opportunity to explore new avenues for technology integration and product development.
- **Market Expansion**: Vertical industries, SMEs, and start-ups are interested in expanding their market presence and offerings within the automotive and mobility sectors. They see collaboration with EcoMobility as a means to access new markets and customer segments, particularly in the rapidly evolving domain of shared mobility and smart cities.
- **Competitive Advantage**: By participating in EcoMobility, these stakeholders aim to gain a competitive advantage by being early adopters of cutting-edge technologies and

innovative business models. They see the project as a way to differentiate themselves from competitors and strengthen their position in the market.

- **Collaborative Opportunities**: Vertical industries, SMEs, and start-ups are interested in forging collaborations and partnerships with other stakeholders involved in the project. They see value in networking sessions, interactive demos, and showcasing events as platforms for building relationships and exploring potential collaborations.
- **Sustainability and Efficiency**: These stakeholders are likely interested in solutions that promote sustainability, efficiency, and optimization within the mobility ecosystem. They see potential benefits in leveraging EcoMobility's technologies and methodologies to enhance their operations and contribute to more sustainable transportation systems.

4.2.3.2 Medium of Communication

In the EcoMobility project, we will use communication methods mentioned in Table 4 to engage with the key players in SH3.

Communication medium	Description
Targeted Events and Presentations	Participate in industry-specific events, conferences, and workshops where these stakeholders are likely to be present. Deliver presentations highlighting the relevance and benefits of EcoMobility to their businesses
Networking Sessions	Host networking sessions or roundtable discussions to facilitate direct interactions and exchanges between EcoMobility representatives and stakeholders from vertical industries, SMEs, and start-ups. Provide opportunities for informal discussions and relationship-building.
Interactive Demos and Showcasing	Organize interactive demos and showcases to demonstrate the capabilities and potential applications of EcoMobility's technologies. Allow stakeholders to experience firsthand how these innovations can benefit their businesses and contribute to their objectives.
Social Media Engagement	Utilize social media platforms to share updates, insights, and success stories related to EcoMobility. Engage with the vertical industries, SMEs, and start-ups community through targeted social media campaigns, posts, and interactions.
Website and Online Resources	Maintain a dedicated website or online portal for EcoMobility where stakeholders can access information, resources, and project updates. Ensure that the website is user-friendly and provides comprehensive information about the project's objectives, activities, and outcomes.
Specialized Press and Publications	Collaborate with specialized press and publications that cater to vertical industries, SMEs, and start-ups. Publish articles, case studies, or thought leadership pieces to raise awareness and generate interest in EcoMobility within these communities.

Direct Outreach and Partnerships	Identify key stakeholders within vertical industries, SMEs, and start-ups and reach out to them directly to discuss potential collaboration opportunities. Build strategic partnerships and alliances to foster long-term engagement and collaboration

Table 4: SH3- medium of communication

4.2.4 SH4 - Policy makers

Policy makers are individuals or groups responsible for formulating, implementing, and evaluating policies at various levels of government, as well as within organizations, institutions, and international bodies. These individuals play a crucial role in shaping laws, regulations, and strategies that govern a wide range of issues, including economic development, healthcare, education, environment, social welfare, and foreign affairs. Key players in the policy-making process are listed in Figure 11.

Figure 11: Key players in SH4

4.2.4.1 Interest

There are various interests of the key players in the project. Some of them are mentioned below.

- **Policies for Future**: The stakeholders want to promote sustainable transportation policies that align with national environmental goals and address public safety concerns. Enhancing economic competitiveness through innovation and technology advancements in the automotive industry is plays a crucial role for future mobility. Furthermore, the policy makers want to support job creation and economic growth by fostering a conducive environment for research, development, and investment in mobility solutions. Addressing regulatory challenges and ensuring compliance with relevant laws and regulations, including those related to data privacy, cybersecurity, and vehicle safety standards are of prime importance for the policy makers. The EcoMobility consortium has partners from various countries of Europe which will aid in voicing our opinion with our outcomes.
- **New trends and their impact**: Contributing evidence-based research and analysis to inform policy discussions and decision-making related to digital mobility and transportation. Identifying emerging trends, opportunities, and challenges in the

automotive industry and recommending policy interventions to promote sustainable and inclusive mobility solutions. Evaluating the societal impacts of new technologies and mobility services, including considerations of equity, accessibility, and environmental sustainability. Offering expertise and guidance on policy frameworks, regulatory approaches, and best practices to support the development and deployment of innovative mobility solutions.

- **Policy consultation:** Advocating for policies that prioritize environmental sustainability, reduce carbon emissions, and promote clean and efficient transportation options. Lobbying for investments in infrastructure, research, and development to support the adoption of emerging technologies and alternative mobility models. Monitoring policy developments and advocating for measures that ensure fairness, transparency, and accountability in the automotive sector.
- **International corporation**: Promoting international cooperation and collaboration on mobility-related issues, including harmonization of standards, data sharing agreements, and cross-border regulatory frameworks. Supporting capacity-building efforts and technical assistance to help countries adopt sustainable mobility solutions and meet global development goals. Setting guidelines and principles for ethical and responsible use of emerging technologies in transportation, such as AI, IoT, and autonomous vehicles. Facilitating knowledge exchange and sharing best practices among member states to accelerate progress towards sustainable, inclusive, and resilient transportation systems.

4.2.4.2 Medium of Communication

In the EcoMobility project, we will employ following communication methods to engage with the key players.

Communication medium	Description
Policy Briefs and White Papers	Prepare concise and informative policy briefs or white papers highlighting the relevance, objectives, and potential policy implications of the EcoMobility project
Stakeholder Meetings and Workshops	Organize stakeholder meetings, workshops, or roundtable discussions to facilitate direct engagement with government officials, think tanks, advocacy groups, and international organizations
Public Consultations and Feedback Mechanisms	Establish mechanisms for gathering input and feedback from policy makers and other stakeholders throughout the project lifecycle, ensuring their perspectives are considered in decision-making processes.
Media Outreach and Public Relations	Utilize media channels, press releases, and op-eds to disseminate project updates, key findings, and success stories to a broader audience, including policymakers and the general public.
Partnerships and Collaboration	Foster partnerships and collaboration with relevant government agencies, international organizations, and advisory bodies to leverage their expertise, networks, and resources in advancing the project objectives

Online Platforms and Digital Engagement	Maintain an informative and user-friendly project website or online platform where stakeholders can access relevant resources, publications, and interactive tools, and participate in online discussions and surveys.

Table 5: SH4- medium of communication

4.2.5 SH5 - Standardization Community

A standardization community refers to a group of individuals, and organizations involved in the process of creating, maintaining, and promoting standards within a particular industry or field. The key players in the standardization community are summarized in Figure 12.

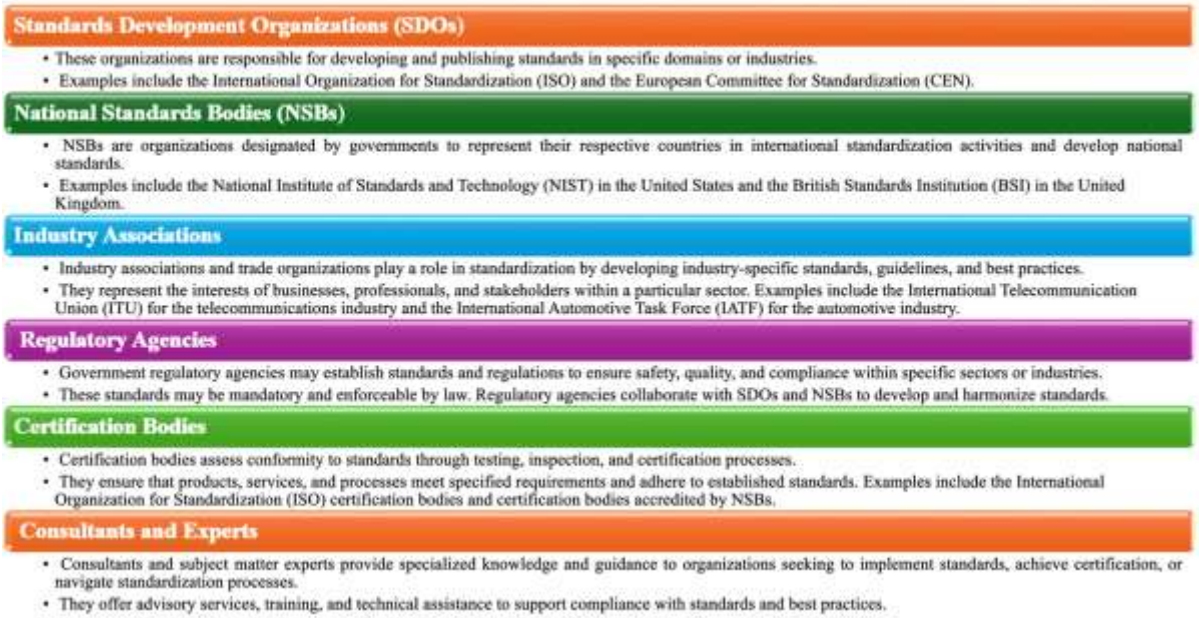

Figure 12: Key players in SH5

4.2.5.1 Interest

The stakeholders are motivated by the following interests.

- **Harmonizing Standards**: Standardization organizations and regulatory agencies are interested in ensuring that the innovations and technologies developed in the EcoMobility project align with existing standards or contribute to the development of new standards. They seek to harmonize technical requirements, specifications, and protocols to promote interoperability, compatibility, and safety across the automotive industry.
- **Enhancing Safety and Quality**: Regulatory agencies, certification bodies, and industry associations prioritize safety, quality, and compliance in transportation systems. They are interested in leveraging the advancements in digital mobility and automated driving technologies to enhance vehicle safety, reduce accidents, and improve overall transportation efficiency. Their focus is on developing standards and regulations that address emerging risks and ensure the reliability and performance of autonomous vehicles and related infrastructure.
- **Facilitating Global Trade and Market Access**: International and regional organizations, industry associations, and certification bodies are interested in promoting global trade and market access for automotive products and services. They seek to facilitate the adoption and acceptance of standardized solutions, certifications, and best

practices that enable seamless integration and interoperability in diverse markets. Their goal is to reduce trade barriers, streamline regulatory compliance, and foster international collaboration in the automotive industry.

- **Driving Innovation and Competitiveness**: Academic and research institutions, industry associations, and industry stakeholders are interested in driving innovation and competitiveness in the automotive sector. They recognize the importance of standardization in facilitating the adoption of new technologies, promoting industry best practices, and supporting the development of sustainable mobility solutions. Their involvement in standardization activities aims to advance technological advancements, improve industry competitiveness, and address societal and environmental challenges.
- **Addressing Societal and Environmental Concerns**: NGOs, academic institutions, and international organizations are interested in promoting sustainability, social responsibility, and ethical considerations in the development and deployment of automotive technologies. They advocate for the inclusion of environmental and social impact assessments in standardization processes, as well as the incorporation of principles such as equity, accessibility, and inclusivity in transportation systems. Their participation in standardization activities aims to ensure that the EcoMobility project aligns with broader societal goals and addresses the needs of diverse stakeholders.

4.2.5.2 Medium of Communication

We will engage with the standardization community using various communication methods. Some of them are mentioned below.

Communication medium	Description
Engage with Industry Associations and Trade Organizations	Participate in industry-specific events, conferences, and workshops organized by relevant associations and trade organizations to showcase EcoMobility's innovations, share insights, and gather feedback from industry stakeholders
Collaborate with Standards Development Organizations and National Standards Bodies	Establish partnerships and collaborative initiatives with SDOs and NSBs to contribute to the development of relevant standards, guidelines, and best practices. Engage in technical committees, working groups, and standardization forums to shape the direction of standardization activities in the automotive sector.
Participate in Regulatory Forums and Consultations	Stay informed about regulatory developments, policy initiatives, and public consultations related to transportation standards and regulations. Provide input and expertise to regulatory agencies on issues relevant to EcoMobility's objectives and technological advancements.
Utilize Online Platforms and	Leverage online platforms, forums, and knowledge sharing networks established by standardization organizations, industry associations, and research

Knowledge Sharing Networks	institutions to disseminate information, exchange ideas, and collaborate with relevant stakeholders in the standardization community
Conduct Stakeholder Workshops and Focus Groups	Organize stakeholder workshops, focus groups, and expert consultations to facilitate dialogue, gather insights, and build consensus on standardization priorities, challenges, and opportunities related to EcoMobility's objectives.
Publish Research and Technical Papers	Share research findings, technical insights, and case studies from the EcoMobility project through peer-reviewed journals, technical publications, and industry magazines to contribute to the body of knowledge in the standardization community and demonstrate thought leadership in the field.

Table 6: SH5- medium of communication

4.2.6 SH6 – Citizens

Citizens are individuals who are impacted by the development and implementation of automotive technologies, policies, and practices. Citizens play various roles in automotive research projects and are affected by the outcomes in several ways. The various key players in this category are illustrated in Figure 13.

Figure 13: Key players in SH6

4.2.6.1 Interest

The key players in this category have following interests.

- **Safety and Security**: Citizens are interested in automotive technologies that prioritize their safety and security on the roads. They seek assurances that vehicles developed through the EcoMobility project adhere to rigorous safety standards and incorporate features such as advanced driver assistance systems (ADAS), collision avoidance systems, and robust cybersecurity measures.

- **Environmental Sustainability**: Citizens are increasingly concerned about the environmental impact of transportation and are interested in eco-friendly mobility solutions. They support efforts to develop electric and hybrid vehicles, reduce emissions, and promote sustainable transportation practices to mitigate air pollution and combat climate change.
- **Affordability and Accessibility**: Citizens value affordable and accessible transportation options that meet their mobility needs. They are interested in projects like EcoMobility that aim to develop cost-effective and inclusive mobility solutions, ensuring that innovative technologies are accessible to all socioeconomic groups and geographic areas.
- **User Experience and Comfort**: Citizens prioritize comfort, convenience, and user experience when it comes to vehicle design and functionality. They are interested in features that enhance comfort, connectivity, and entertainment options within vehicles, as well as user-friendly interfaces and intuitive controls that improve the overall driving experience.
- **Community Impact and Engagement**: Citizens are interested in projects that positively impact their communities and engage them in the decision-making process. They appreciate opportunities to provide feedback, participate in pilot programs, and contribute to shaping the future of mobility through citizen engagement initiatives and collaborative partnerships.

4.2.6.2 Medium of Communication

We will engage with the key players in SH6 with communication mediums mentioned in Table 7.

Communication medium	Description
Community Workshops and Town Hall Meetings	Organize community workshops and town hall meetings to provide citizens with information about the EcoMobility project, gather feedback, and address concerns or questions directly.
Online Platforms and Social Media	Utilize online platforms and social media channels to disseminate project updates, engage with citizens, and facilitate ongoing dialogue. Create dedicated forums or groups where citizens can share their perspectives and participate in discussions.
Surveys and Feedback Mechanisms	Implement surveys and feedback mechanisms to solicit input from citizens on their preferences, priorities, and expectations regarding automotive technologies and mobility solutions. Use this feedback to inform project decision-making and design processes.
Public Information Campaigns	Launch public information campaigns to raise awareness about the goals, benefits, and impacts of the EcoMobility project. Use various communication channels such as websites, newsletters, press releases, and community events to reach a diverse audience.

Collaborative Partnerships	Forge collaborative partnerships with community organizations, local authorities, and civic groups to amplify the reach of communication efforts and foster community engagement. Leverage existing networks and community relationships to ensure inclusive participation and representation.
Education and Outreach Programs	Develop educational materials and outreach programs to inform citizens about the importance of sustainable mobility, environmental stewardship, and responsible transportation choices. Engage schools, libraries, and community centers to reach diverse audiences and promote awareness of eco-friendly transportation options.

Table 7: SH6- medium of communication

4.2.7 SH7 – Project Consortium

The EcoMobility project consortium is large and include large enterprises, research institutes, and universities from all over the Europe. They are the primary stakeholders which are affected by the outcomes of the project. Additionally, it includes project officer, reviewers and funding organization. Figure 14 shows some key players commonly involved in this category.

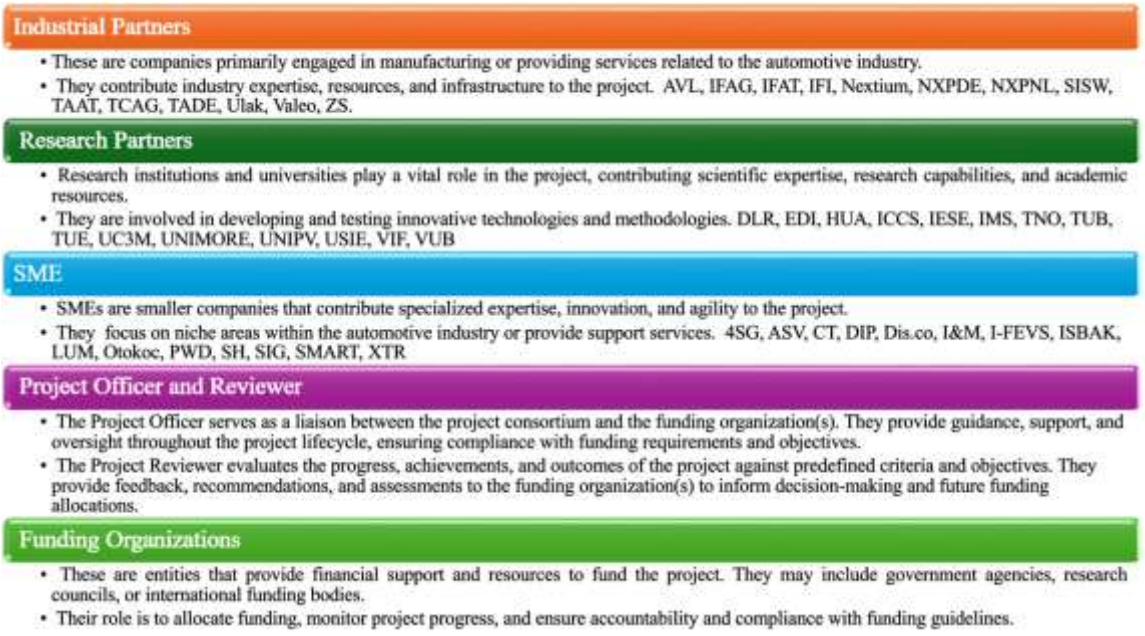

Figure 14: Key players in SH7

4.2.7.1 Interest

The key players have following interests in the EcoMobility project.

The key players have following interests in the EcoMobility project.

- **Innovation and Technological Advancement**: All stakeholders are interested in advancing innovation and technology within the automotive industry, particularly in the areas of sustainable digital mobility, autonomous vehicles, data-driven services, and electronic components and systems.
- **Market Competitiveness**: Industrial partners, SMEs, and funding organizations are concerned with maintaining or enhancing their competitive positions within the

automotive market by being involved in cutting-edge research and development projects like EcoMobility.

- **Research and Knowledge Generation**: Research partners are primarily interested in contributing to the generation of new knowledge, insights, and methodologies related to digital mobility, system integration, software engineering, and interdisciplinary collaboration.
- **Financial Sustainability**: SMEs, research partners, and industrial partners are interested in ensuring the financial sustainability of the project, either through direct funding, research grants, or by leveraging project outcomes to secure future investments or commercial opportunities.
- **Regulatory Compliance and Policy Alignment**: Project officers, reviewers, and funding organizations are interested in ensuring that the project complies with relevant regulations, meets funding requirements, and aligns with strategic priorities set forth by governing bodies or funding agencies.

4.2.7.2 Medium of Communication

We will interact with the key players with communication mediums mentioned in Table 8.

Communication medium	Description
Regular Meetings and Workshops	Organize regular consortium meetings, workshops, and progress reviews to facilitate communication, collaboration, and alignment among industrial and research partners, project officer, and project reviewer.
Online Collaboration Platforms	Utilize online collaboration platforms, project management tools, and shared repositories to streamline communication, document sharing, and task coordination among consortium members.
Email Updates and Newsletters	Send periodic email updates, newsletters, and project bulletins to keep consortium members informed about project developments, milestones, deadlines, and key decisions.
Stakeholder Liaison and Coordination	Designate a dedicated stakeholder liaison or coordinator within the project team to serve as a primary point of contact for consortium members, addressing inquiries, feedback, and concerns in a timely manner.
Interactive Presentations and Webinars	Organize interactive presentations, webinars, and training sessions to disseminate project findings, share best practices, and facilitate knowledge exchange among consortium members.
Feedback Mechanisms and Surveys	Establish feedback mechanisms, surveys, and evaluation forms to solicit input, suggestions, and assessments from consortium members regarding project progress, performance, and areas for improvement.
Documentation and Reporting	The stakeholders want to develop collaborative documentation, progress reports, and deliverables in

	consultation with consortium members, ensuring transparency, accuracy, and accountability in project reporting and documentation..

Table 8: SH7- medium of communication

4.3 Stakeholder Categorization in Supply Chain

EcoMobility project will deliverable various processes, technologies and tools for future mobility system. The project outcomes have been divided in multiple supply chains. There are 6 supply chains in the EcoMobility project as shown in the Figure 15. Supply chains SC1 to SC4 are more focused on technology and SC5 - SC6 are output enabler. In this section, the identified stakeholders and their key players have been categorized to different supply chains based on their interests.

Figure 15: EcoMobility Supply Chains

4.3.1 Supply Chain 1

In SC1, we will implement an edge-cloud based HW/SW platform specifically tailored for SAE-L3 and above vehicles. DevOps principles are being integrated into the V-process to ensure fast innovation and ongoing improvements. Continuous post-deployment systems improvement is a key focus, allowing for quick identification and rectification of system flaws. AI support is embedded throughout the development phases to enhance functionality and performance.

Compliance with the UNECE R155 standard for cyber security management system (CSMS) is a priority, ensuring robust protection against cyber threats. Our endeavor includes the development of a secure hardware/software solution facilitating continuous update, monitoring, and remote maintenance of vehicles. Additionally, we have planned demonstrators such as Real Driving Verification (RDV) and Modular and smart vehicle E/E architecture to showcase our progress and innovations.

The SC1 is quite interesting for SH1, SH3, SH4, SH5, SH6 and SH7. The scientific community and industry will benefit a lot from the outcomes of the supply chain. The automotive industry has to align itself to the R155 regulations. The demonstrators in the SC1 aims to improve security of automotive software and automobiles in operation through continuous monitoring which will address some of guidelines of R155.

4.3.2 Supply Chain 2

In SC2, the focus is on leveraging fused information from maps and perception sensors to ensure reliable localization, enhancing the overall accuracy and precision of navigation systems. Additionally, the project aims to advance ADAS/AD systems, striving to improve their functionality and performance to enhance the safety and efficiency of electric vehicles within the mobility ecosystem.

The SC2 is the most pertinent for stakeholders SH2, SH4, SH5, SH6 and SH7. In autonomous driving vehicles perception systems, enriched maps and V2X communication will be of prime importance. The SC2 aims to improve lane localization and positioning, and route planning. The key players from automotive industry and policy makers will certainly benefit from the outcomes of SC2. Additionally, citizens and automotive consumers will enjoy the improved and safe driving experience.

4.3.3 Supply Chain 3

In SC3, In the realm of EcoMobility, the project explores opportunities presented by highly automated vehicles, focusing on those reaching Level 4 and 5 autonomy. It envisions a collaborative management system that coordinates driving actions, akin to the control systems utilized in air traffic management, to enhance safety and efficiency on the roads. Safety enhancements are envisaged through the integration of connected vehicles, enabling them to receive driving proposals in real-time, fostering a vision of collaboratively coordinated driving reminiscent of air traffic control for planes.

The SC3 is of prime interests for SH3, SH4, SH6 and SH7. The level 4 and 5 autonomous vehicle will transform the mobility. The automotive industry has been working on it for tirelessly. It is going to bring in lot of policy challenges. Therefore, the policy makers have to stay up to date with the technology nuance of the automotive vehicles. The citizens and automobile consumers are keen to see and experience level 5 vehicle on the streets.

4.3.4 Supply Chain 4

In SC4, In the project EcoMobility, we aim to develop enhanced battery management functionalities to optimize the performance of electric vehicles. We prioritize accurate sensing and data collection to ensure precise monitoring of battery health and usage patterns. Additionally, our focus is on enhancing computational capabilities to meet the demands of next-generation EVs, ensuring they operate efficiently and reliably. Throughout our efforts, we emphasize meeting stringent requirements for reliability, safety, and longevity to enhance the overall user experience and promote sustainable mobility.

SC4 is of interest for SH2, SH3, SH4, SH5, SH6, SH7. Battery management is very crucial for electric vehicles. The outcomes of SC4 on battery management will be advantageous for the automotive industry, standardization community and citizens. The automobile users will enjoy better battery health statistics.

4.3.5 Supply Chain 5

In SC5, In the EcoMobility project, we're focusing on developing information systems to facilitate multimodal transport. Additionally, we're implementing smart city solutions to

enhance infrastructure resilience and efficiency. Our aim is to optimize transport network efficiency and improve fleet management within the project scope. We have planned demonstrators including smart mobility for multi-modal autonomous and tele-operated transport, AI-driven solutions for efficient door-to-door transportation, and integration of smart city concepts with user involvement.

SC5 is of interest to SH1, SH2, SH3, SH4, SH6, SH7. The multimodal transport will be beneficial for citizens. Additionally, the policy makers will have to address the challenges of changing mobility ecosystem. The project partners will contribute in developing an efficient smart city slutions.

4.3.6 Supply Chain 6

In SC6, In the project EcoMobility, the focus lies on integrating cutting-edge technologies to enhance EcoMobility solutions. It emphasizes the importance of versatility and reliability within the electrified automotive industry, ensuring robustness in the implementation of sustainable transportation solutions. The adoption of the quintuple helix innovation model aims to maximize societal benefits by incorporating inputs from industry, academia, government, civil society, and individuals into the innovation process.

SC6 is of interest to SH2, SH3, SH4, SH5, SH7. Supply Chain 6 in the Ecomobility project prioritizes the development and integration of novel technologies tailored for EcoMobility, alongside crafting integrated business models informed by thorough analysis of market and socio-economic parameters. It will be quite helpful for the standardization community. Key efforts include strengthening the European electrified vehicles industry, understanding consumer acceptance, and devising sustainable business models for EcoMobility outcomes. The key players from automotive industry and policy makers will benefit from the business models.

4.4 Stakeholder Prioritization

Stakeholder prioritization is the process of analyzing and ranking identified stakeholders based on their level of influence, interest, and importance to a project. It involves assessing the needs, expectations, and concerns of various stakeholders and determining which ones require the most attention, resources, and engagement.

In the section 4.2, we have identified the various stakeholders of the EcoMobility project and listed the key players, their interests and medium of communication of each stakeholder. Table 9 gives details on the ranking of identified stakeholders.

Rank	Stakeholder Name	Reason
1	SH7 – Project Consortium	All communication, dissemination and exploitation activities originate from the project consortium. They have highest level of influence, impact, and interests in the project outcomes.
2	SH1 – Scientific Community	The project includes multiple partners from pure scientific and research background. They are very well connected in this area and are savvy to use their network and resources to engage with key players in scientific community.

3	SH3 – Vertical Industries, SMEs, and startups	The industrial partners are the engines of implementation and exploitation activities in the EcoMobility project. We have a balanced mix of SMEs, startups and large enterprises in the project. Their influence and needs will help us to deliver high quality products.
4	SH4 – Policy makers	The EcoMobility consortium wants to have a long lasting impact with its outcomes. Which would be possible if the results gets translated into regulations, directives or policies. Therefore, we have high interests in key players of the policy management.
5	SH5 – Standardization Community	Standardization community has always eye on the novel solutions in the automotive space. New technologies, security requirements, collaborative development, and the need to innovate the space fuel the new standards. The project will strive to map the project solutions to standards by engaging with the key players.
6	SH2 – Opensource Community	Transparency, collaboration and innovation drive the opensource community. From the EcoMobility project perspective, we want to put the project outcomes, such source code, videos, training materials, documentation in open-source community.
7	SH7 – Citizens	They are the end users which will be impacted by the positive or negative results of the EcoMobility project. We want to raise awareness for safety and security of advanced mobility solutions for this stakeholder. They also have interest and needs in the project outcome to follow the new technology trends and innovative solutions in electric vehicle market.

Table 9: Stakeholder Prioritization

4.5 Stakeholder Engagement

By employing a communication, dissemination, and exploitation (CDE) strategy developed by Steinbeis 2i [1], EcoMobility aims to raise awareness, disseminate results, and exploit outcomes throughout the project duration with its stakeholdres. This strategy runs in parallel, ensuring continuous engagement and impact across all helixes of the Quintuple Helix Innovation model. We can look into the details of the CDE strategy below.

4.5.1 Communication

EcoMobility initiated communication activities early on to raise awareness about the project's objectives, methodologies, and expected outcomes. This involves engaging with stakeholders through various channels such as social media, online communication campaigns, science cafes, webinars, and showcasing events.

The project ensures that the scientific community, innovators, policymakers, industry stakeholders, and the general public are informed about its progress and potential impact. By effectively communicating the relevance and significance of EcoMobility's activities, the project fosters interest and support among diverse audiences.

4.5.2 Dissemination

As EcoMobility progresses and generates initial results, dissemination activities are ramped up to share findings, insights, and achievements with relevant stakeholders. This includes publishing open-access publications, participating in scientific events and exhibitions, organizing workshops, and showcasing demonstrations.

The project leverages targeted dissemination strategies tailored to specific stakeholder groups. For example, scientific publications and presentations cater to the scientific community, while interactive demos and networking sessions target industry stakeholders and potential adopters.

4.5.3 Exploitation

Exploitation activities focus on maximizing the practical use and impact of EcoMobility's outcomes. This involves identifying opportunities for further development, commercialization, or policy integration based on project results.

EcoMobility collaborates with stakeholders to explore how project deliverables can be applied in real-world contexts, contributing to innovation uptake, economic growth, and societal benefits. For example, the project may work with industry partners to integrate new technologies or practices into their operations, or engage policymakers to incorporate project findings into relevant policies and regulations.

By proactively pursuing exploitation opportunities and leveraging project assets, EcoMobility aims to ensure that its efforts translate into tangible benefits for stakeholders and society as a whole.

5 Conclusions

The deliverable set the baseline for stakeholder management which will be useful during and beyond the project duration. The key features of stakeholder managements are stakeholder identification, categorization, prioritization, and engagement. A significant amount of details are provided in the deliverable on all these aspects. We have identified 7 key stakeholder categories and in each category key players, their interests in the project and the medium of engagement with are described in detail. We will utilize the CDE strategy to engage with the project stakeholders.

Furthermore, we have prioritized the stakeholders based on their needs, interests, impact and involvement in the project. Going further, we will monitor the progress of the engagement with the stakeholders. The engagement will involve various activities and channels. A report will be provided on the outcomes of the stakeholder engagement.

References

[1] Ivo Zeller et.al., Navigating EU Projects Communication, Dissemination and Exploitation Tools for Success.

[2] EcoMobility Grant proposal Agreement 09 september 2023, EU HORIZON-KDT-JU-2022-2-RIA-Topic-1, Proposal number: 101112306

[3] EcoMobility deliverable D7.8: Market study, July, 2023, WP7 – Standardisation, Exploitation and stakeholders relation

[4] Connected Autonomous Vehicles, ferrovial, European Road Transport Research AdvisoryCouncil,online,https://www.ferrovial.com/en/innovation/technologies/connected-autonomous-vehicles

[5] Trends and developments in electric vehicle markets, iea, online, https://www.iea.org/reports/global-ev-outlook-2021/trends-and-developments-in-electric-vehicle-markets

[6] New registrations of electric vehicles in Europe Published 24 Oct 2023, https://www.eea.europa.eu/en/analysis/indicators/new-registrations-of-electric-vehicles

[7] Carayannis, Elias & Barth, Thorsten & Campbell, David. (2012). The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. Journal of Innovation and Entrepreneurship. 1. 10.1186/2192-5372-1-2.

[8] IEA, Global electric passenger car stock, 2010-2020, IEA, Paris https://www.iea.org/data-and-statistics/charts/global-electric-passenger-car-stock-2010-2020, IEA. Licence: CC BY 4.0